

4.7(6.1) - Solving Quadratic Equations

Recall:

To solve an equation, find value(s) that satisfy the equation (i.e., make it true).

This value is called the solution or root of the equation.

Ex.1 Solve $x^2 - 12x + 32 = 0$

$$\begin{array}{l} \text{M A N} \\ 32 \quad -12 \quad -8, 4 \\ x^2 - 8x - 4x + 32 = 0 \\ x(x-8) - 4(x-8) = 0 \\ (x-4)(x-8) = 0 \\ \begin{array}{l} x-4=0 \quad x-8=0 \\ x=4 \quad x=8 \end{array} \end{array}$$

$$\begin{array}{l} -8 + -4 = -12 \\ = (x-8)(x-4) \end{array}$$

We have most often solved for the zeroes of the quadratic equation, but we can solve for any value.

Ex.2 Solve $y = 2x^2 + 5x - 12$ for(a) $y = 0$

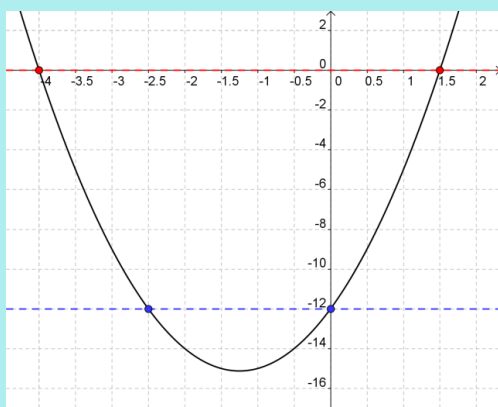
$$\begin{array}{l} \text{M A N} \\ -12 \quad 5 \quad 8, -3 \\ 0 = 2x^2 + 5x - 12 \\ 0 = 2x^2 + 8x - 3x - 12 \\ 0 = 2x(x+4) - 3(x+4) \\ = (2x-3)(x+4) \\ \begin{array}{l} 2x-3=0 \quad x+4=0 \\ \frac{2x}{2} = \frac{3}{2} \quad x = -4 \\ x = \frac{3}{2} \quad x = -4 \end{array} \end{array}$$

(b) $y = -12$

$$\begin{array}{l} -12 = 2x^2 + 5x - 12 \\ 0 = 2x^2 + 5x - 12 + 12 \\ 0 = 2x^2 + 5x \quad \text{GCF} \\ 0 = x(2x+5) \\ \begin{array}{l} x=0 \quad 2x+5=0 \\ x=0 \quad \frac{2x}{2} = \frac{-5}{2} \\ x=0 \quad x = -\frac{5}{2} \end{array} \end{array}$$

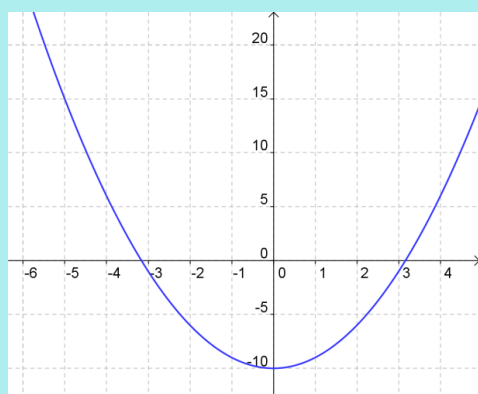
To solve using factored form:

- 1) Expand all terms
- 2) Move all terms to one side of the equal sign so that the equation equals zero
- 3) Factor your expression (if possible)
- 4) Set each factor equal to zero and solve

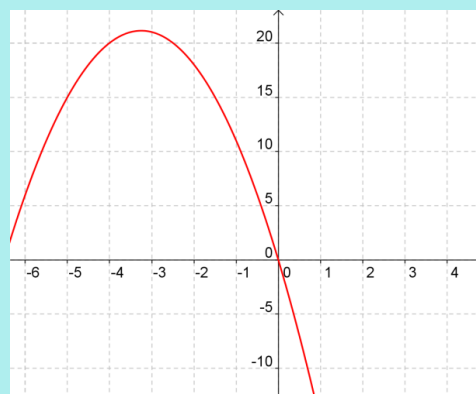
Ex.2 Solve $y = 2x^2 + 5x - 12$ for (a) $y = 0$
(b) $y = -12$ Ex.3 Solve: $x^2 - 10 = -x(2x + 13)$

$$\begin{array}{l} \text{M A N} \\ -10 \quad 13 \quad 15, -2 \\ x^2 - 10 = -2x^2 - 13x \\ x^2 + 2x^2 + 13x - 10 = 0 \\ 3x^2 + 13x - 10 = 0 \\ 3x^2 + 15x - 2x - 10 = 0 \\ 3x(x+5) - 2(x+5) = 0 \\ (3x-2)(x+5) = 0 \\ \begin{array}{l} 3x-2=0 \quad x+5=0 \\ \frac{3x}{3} = \frac{2}{3} \quad x = -5 \\ x = \frac{2}{3} \quad x = -5 \end{array} \end{array}$$

$$y = x^2 - 10 \quad \text{LS.}$$

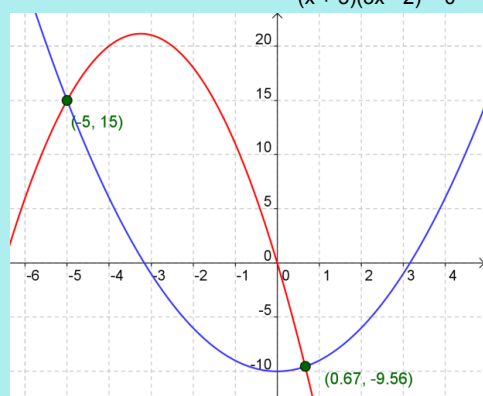


$$y = -x(2x + 13) \quad \text{RS.}$$



$$x^2 - 10 = -x(2x + 13)$$

which became
 $3x^2 + 13x - 10 = 0$
 $(x + 5)(3x - 2) = 0$



Assigned Work:

p.320 # 4ac, 6ace, 7ace, 11